



SEQUENCE LISTING

<110> Li, Lian-Chao
Cosgrove, Daniel J.

<120> PLANT CELL WALL LOOSENING ACTIVITY OF GROUP 2/3 ALLERGENS OF
GRASS POLLEN

<130> P06331US01

<140> US 10/628,296

<141> 2003-07-28

<150> US 60/399,688

<151> 2002-07-29

<160> 18

<170> PatentIn version 3.2

<210> 1

<211> 291

<212> DNA

<213> Lolium perenne

<400> 1

acaaaagtgc atttaactgt ggagaaggggt tctgacgcga agacgctggt gctgaacatc 60

aagtacacga ggccagggga caccctggcg gaggtggagc tccggcagca cggctcggag 120

gagtgggaac ccatgacgaa gaagggcaac ctgtgggagg tgaagagcgc caagccgctc 180

accggcccaa tgaacttccg cttcctctcc aaggggcgga tgaagaacgt cttcgacgag 240

gtcatcccca cgccttcac ggtcggcaaa acctacacc cagaatacaa t 291

<210> 2

<211> 97

<212> PRT

<213> Lolium perenne

<400> 2

Thr Lys Val Asp Leu Thr Val Glu Lys Gly Ser Asp Ala Lys Thr Leu
1 5 10 15

Val Leu Asn Ile Lys Tyr Thr Arg Pro Gly Asp Thr Leu Ala Glu Val
20 25 30

Glu Leu Arg Gln His Gly Ser Glu Glu Trp Glu Pro Met Thr Lys Lys
35 40 45

Gly Asn Leu Trp Glu Val Lys Ser Ala Lys Pro Leu Thr Gly Pro Met

50

55

60

Asn Phe Arg Phe Leu Ser Lys Gly Gly Met Lys Asn Val Phe Asp Glu
65 70 75 80

Val Ile Pro Thr Ala Phe Thr Val Gly Lys Thr Tyr Thr Pro Glu Tyr
85 90 95

Asn

<210> 3
<211> 291
<212> DNA
<213> Lolium perenne

<220>
<221> misc_feature
<222> (133)..(133)
<223> Conservatively modified variant; C=substituted nucleotide

<400> 3
acaaaagtcg atttaactgt ggagaaggggt tctgacgcga agacgctggg gctgaacatc 60
aagtacacga ggccagggga caccctggcg gaggtggagc tccggcagca cggctcggag 120
gagtgggaac ccctgacgaa gaagggcaac ctgtgggagg tgaagagcgc caagccgctc 180
accggcccaa tgaacttccg cttcctctcc aagggcggca tgaagaacgt cttcgacgag 240
gtcatcccca cgccttcac ggtcggcaaa acctacaccc cagaatacaa t 291

<210> 4
<211> 97
<212> PRT
<213> Lolium perenne

<220>
<221> MISC_FEATURE
<222> (83)..(83)
<223> Conservatively modified variant; A=Substituted amino acid at position 83 (proline, cca to alanine, ccc).

<400> 4

Thr Lys Val Asp Leu Thr Val Glu Lys Gly Ser Asp Ala Lys Thr Leu
1 5 10 15

Val Leu Asn Ile Lys Tyr Thr Arg Pro Gly Asp Thr Leu Ala Glu Val

20 25 30
 Glu Leu Arg Gln His Gly Ser Glu Glu Trp Glu Pro Met Thr Lys Lys
 35 40 45
 Gly Asn Leu Trp Glu Val Lys Ser Ala Lys Pro Leu Thr Gly Pro Met
 50 55 60
 Asn Phe Arg Phe Leu Ser Lys Gly Gly Met Lys Asn Val Phe Asp Glu
 65 70 75 80
 Val Ile Ala Thr Ala Phe Thr Val Gly Lys Thr Tyr Thr Pro Glu Tyr
 85 90 95

Asn

<210> 5
 <211> 20
 <212> PRT
 <213> Lolium perenne

<400> 5

Thr Lys Val Asp Leu Thr Val Glu Lys Gly Ser Asp Ala Lys Thr Leu
 1 5 10 15

Val Leu Asn Ile
 20

<210> 6
 <211> 24
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Degenerate oligonucleotide design based on the N-terminal and
 C-terminal amino acid sequences of Lol p 3.

<220>
 <221> misc_feature
 <222> (3)..(3)
 <223> N=A,C,G,T

<220>
 <221> misc_feature
 <222> (9)..(9)
 <223> N=A,C,G,T

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<220>
<221> misc_feature
<222> (15)..(15)
<223> N=A,C,G,T

<220>
<221> misc_feature
<222> (18)..(18)
<223> N=A,C,G,T

<220>
<221> misc_feature
<222> (21)..(21)
<223> N=A,C,G,T

<400> 6
acnaargtng ayytnacngt ngar

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24

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<210> 7
<211> 25
<212> DNA
<213> Artificial Sequence

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<220>
<223> Degenerate oligonucleotide design based on the N-terminal and
C-terminal amino acid sequences of Lol p 3.

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<220>
<221> misc_feature
<222> (14)..(14)
<223> N=A,C,G,T

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<220>
<221> misc_feature
<222> (17)..(17)
<223> N=A,C,G,T

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<220>
<221> misc_feature
<222> (23)..(23)
<223> N=A,C,G,T

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<400> 7
cyyarttrta ytcngngtr tangt

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25

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<210> 8
<211> 93
<212> PRT
<213> Zea mays

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<400> 8

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Thr Phe Gln Val Gly Lys Gly Ser Lys Pro Gly His Leu Val Leu Thr

1 5 10 15
 Pro Asn Ile Ala Thr Ile Ser Asp Val Glu Ile Lys Glu His Gly Gly
 20 25 30
 Asp Asp Phe Ser Phe Thr Leu Lys Glu Gly Pro Ala Gly Thr Trp Thr
 35 40 45
 Leu Asp Thr Lys Ala Pro Leu Lys Tyr Pro Leu Cys Ile Arg Phe Ala
 50 55 60
 Thr Lys Ser Gly Gly Tyr Arg Ile Ala Asp Asp Val Ile Pro Ala Asp
 65 70 75 80
 Phe Lys Ala Gly Thr Thr Tyr Lys Thr Thr Leu Ser Ile
 85 90

<210> 9
 <211> 96
 <212> PRT
 <213> Dactylis glomerata

<400> 9

Val Lys Val Thr Phe Lys Val Glu Lys Gly Ser Asp Pro Lys Lys Leu
 1 5 10 15
 Val Leu Asp Ile Lys Tyr Thr Arg Pro Gly Asp Thr Leu Ala Glu Val
 20 25 30
 Glu Leu Arg Gln His Gly Ser Glu Glu Trp Glu Pro Leu Thr Lys Lys
 35 40 45
 Gly Asn Leu Trp Glu Val Lys Ser Ser Lys Pro Leu Thr Gly Pro Phe
 50 55 60
 Asn Phe Arg Phe Met Ser Lys Gly Gly Met Arg Asn Val Phe Asp Glu
 65 70 75 80
 Val Ile Pro Thr Ala Phe Lys Ile Gly Thr Thr Tyr Thr Pro Glu Glu
 85 90 95

<210> 10
 <211> 90
 <212> PRT

<213> Oryza sativa .

<400> 10

Met Glu Val Ala Lys Gly Ser Ser Ala Lys Ser Leu Glu Leu Val Thr
1 5 10 15

Asn Val Ala Ile Ser Lys Val Glu Val Lys Glu Lys Gly Gly Lys Asp
20 25 30

Trp Val Ala Leu Lys Glu Ser Ser Ser Asn Thr Trp Thr Leu Lys Ser
35 40 45

Glu Ser Pro Leu Lys Gly Pro Phe Ser Val Arg Phe Leu Val Lys Asn
50 55 60

Ser Gly Tyr Arg Val Val Asp Asp Ile Ile Pro Glu Ser Phe Thr Ala
65 70 75 80

Gly Ser Glu Tyr Lys Ser Gly Ile Gln Leu
85 90

<210> 11

<211> 96

<212> PRT

<213> Lolium perenne

<400> 11

Ala Ala Pro Val Glu Phe Thr Val Glu Lys Gly Ser Asp Glu Lys Asn
1 5 10 15

Leu Ala Leu Ser Ile Lys Tyr Asn Lys Glu Gly Asp Ser Met Ala Glu
20 25 30

Val Glu Leu Lys Glu His Gly Ser Asn Glu Trp Leu Ala Leu Lys Lys
35 40 45

Asn Gly Asp Gly Val Trp Glu Ile Lys Ser Asp Lys Pro Leu Lys Gly
50 55 60

Pro Phe Asn Phe Arg Phe Val Ser Glu Lys Gly Met Arg Asn Val Phe
65 70 75 80

Asp Asp Val Val Pro Ala Asp Phe Lys Val Gly Thr Thr Tyr Lys Pro
85 90 95

<210> 12
 <211> 96
 <212> PRT
 <213> Sorghum

<400> 12

Gly Thr Thr Leu Thr Ile Glu Val Gly Lys Asp Ser Thr Ser Thr Lys
 1 5 10 15

Leu Ser Leu Ile Thr Asn Val Ala Ile Ser Glu Val Ser Val Lys Pro
 20 25 30

Lys Gly Ala Thr Asp Phe Thr Asp Asp Leu Lys Glu Ser Glu Pro Lys
 35 40 45

Thr Phe Thr Leu Asp Ser Lys Glu Pro Ile Glu Gly Pro Ile Ala Phe
 50 55 60

Arg Phe Leu Ala Lys Gly Gly Gly Tyr Arg Val Val Asp Asn Ala Ile
 65 70 75 80

Pro Ala Asp Phe Lys Ala Gly Ser Val Tyr Lys Thr Thr Glu Gln Val
 85 90 95

<210> 13
 <211> 100
 <212> PRT
 <213> Hordeum vulgare

<400> 13

Ala Ala Thr Lys Val Lys Phe Thr Val Gln Lys Gly Ser Asp Ala Lys
 1 5 10 15

Lys Leu Val Leu Lys Ile Asp Tyr Thr Arg Ala Gly Asp Thr Leu Ser
 20 25 30

Glu Met Glu Leu Arg Gln His Gly Ser Glu Glu Trp Glu Pro Phe Thr
 35 40 45

Lys Lys Gly Asp Val Trp Glu Leu Ser Ser Ser Lys Pro Leu Val Gly
 50 55 60

Pro Phe Asn Phe Arg Phe Leu Ser Lys Gly Gly Met Lys Asn Val Phe

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65                               70                               75                               80
Asp Glu Val Phe Ser Thr Asp Phe Lys Ile Gly Lys Thr Tyr Glu Pro
      85                               90                               95
Val Tyr Asp Ala
      100

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Ala Pro Pro Pro Val Ser Ile Thr Val Glu Lys Gly Ser Asp Ala Lys
1 5 10 15

His Leu Val Leu Gln Ile Lys Tyr Asp Lys Val Gly Asp Ser Met Lys
20 25 30

Glu Val Glu Leu Glu Gln Asn Glu Asp Trp Leu Pro Leu Lys Lys Gly
35 40 45

Tyr Ser Gly Ala Trp Glu Ile Lys Ser Asp Thr Pro Leu Lys Gly Pro
50 55 60

Phe Ser Phe Arg Tyr Glu Thr Gln Lys Gly Gln Arg Asn Val Phe Asp
65 70 75 80

Asp Ile Val Pro Thr Asp Phe Lys Cys Gly Thr Thr Tyr Lys Pro Glu
85 90 95

Ala Tyr

```
<210> 15
<211> 96
<212> PRT
<213> Phleum pratense

<400> 15
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Val Pro Lys Val Thr Phe Thr Val Glu Lys Gly Ser Asn Glu Lys His
1 5 10 15

Leu Ala Val Leu Val Lys Tyr Glu Gly Asp Thr Met Ala Glu Val Glu
 20 25 30

Leu Arg Glu His Gly Ser Asp Glu Trp Val Ala Met Thr Lys Gly Glu
 35 40 45

Gly Gly Val Trp Thr Phe Asp Ser Glu Glu Pro Leu Gln Gly Pro Phe
 50 55 60

Asn Phe Arg Phe Leu Thr Glu Lys Gly Met Lys Asn Val Phe Asp Asp
 65 70 75 80

Val Val Pro Glu Lys Tyr Thr Ile Gly Ala Thr Tyr Ala Pro Glu Glu
 85 90 95

<210> 16
 <211> 98
 <212> PRT
 <213> Hordeum vulgare

<400> 16

Ala Val Pro Pro Val Ser Phe Thr Val Glu Lys Gly Ser Glu Glu Lys
 1 5 10 15

Lys Leu Ala Leu Gln Ile Lys Tyr Asp Lys Glu Gly Asp Ser Met Lys
 20 25 30

Glu Val Glu Val Lys Gln Gly Glu Glu Trp Leu Pro Leu Asn Lys Cys
 35 40 45

Ala Asn Gly Val Trp Glu Ile Lys Val Asp Glu Pro Leu Lys Gly Pro
 50 55 60

Tyr Ser Ile Arg Tyr Glu Thr Asp Lys Gly Gln Arg Asn Val Phe Asp
 65 70 75 80

Asp Val Val Pro Ala Glu Tyr Lys Ile Gly Thr Thr Tyr Lys Pro Ala
 85 90 95

Glu Pro

<210> 17
 <211> 97

<212> PRT
<213> Triticum aestivum

<220>
<221> MISC_FEATURE
<222> (17)..(17)
<223> X is unknown.

<220>
<221> misc_feature
<222> (27)..(27)
<223> Xaa can be any naturally occurring amino acid

<400> 17

Ala Val Arg Val Lys Leu Thr Val Glu Lys Gly Ser Asp Lys Lys Lys
1 5 10 15

Leu Ala Leu Lys Ile Asp Tyr Thr Arg Pro Xaa Asp Ser Leu Ser Glu
20 25 30

Val Glu Leu Arg Gln His Gly Ser Lys Glu Trp Gln Pro Val Thr Lys
35 40 45

Asn Gly Asp Val Trp Glu Val Ser Cys Ser Lys Pro Leu Val Gly Pro
50 55 60

Phe Asn Phe Arg Phe Leu Ser Lys Asn Gly Met Lys Asn Val Phe Asp
65 70 75 80

Glu Val Phe Ser Thr Asp Phe Lys Ile Gly Lys Thr Tyr Gln Pro Glu
85 90 95

Tyr

<210> 18
<211> 96
<212> PRT
<213> Triticum aestivum

<400> 18

Val Lys Val Lys Leu Thr Val Gln Lys Gly Ser Asp Lys Lys Lys Leu
1 5 10 15

Ala Leu Lys Ile Asp Tyr Thr Arg Pro Asn Asp Ser Leu Ser Glu Val
20 25 30

Glu Leu Arg Gln Tyr Gly Ser Glu Glu Trp Gln Pro Leu Thr Lys Lys
35 40 45

Gly Asp Val Trp Glu Val Ser Cys Ser Lys Pro Leu Val Gly Pro Phe
50 55 60

Asn Phe Arg Phe Leu Ser Lys Asn Gly Met Lys Lys Val Phe Asp Glu
65 70 75 80

Val Phe Ser Thr Asp Phe Lys Ile Gly Lys Thr Tyr Glu Pro Glu Tyr
85 90 95